Soil Moisture Products from the Advanced Microwave Scanning Radiometer (AMSR)

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Abstract

The Advanced Scanning Microwave Radiometer (AMSR) will provide soil moisture products of potentially high value for hydroclimatological applications. The AMSR is currently planned for launch on NASA's EOS-Aqua satellite in December 2000 and on NASDA's ADEOS-II satellite in November 2001. The Aqua and ADEOS-II satellites will be in sun-synchronous orbits with local-time equator crossings of 1:30 pm and 10:30 am, respectively. The AMSR will provide soil moisture observations with a spatial resolution of about 60 km, with global coverage from each satellite every two days. The lowest frequency of the AMSR is 6.9 GHz which will limit the soil moisture retrievals to regions of low vegetation biomass. The observations are sensitive to soil moisture in the top surface layer about 1 cm deep. Candidate algorithms are under development for retrieving soil moisture and associated land parameters from the AMSR data. These algorithms will be discussed along with descriptions of the sampling characteristics of the sensor as they impact the retrieval problem. Intensive field campaigns are planned in the summers of 2001 and 2003 as part of the AMSR soil moisture validation activities. These field campaigns will be patterned after the successful SGP'97 and SGP'99 field experiments. The use of scaling approaches in well-designed field experiments will be crucial in interpreting and utilizing the satellite results. Airborne microwave radiometers at L and C bands will provide a means for scaling from the soil moisture samples at the field scale to larger area soil moisture averages for validation at the 60-km AMSR footprint scale. Significant additional research and involvement from the hydrology community will be required to validate and utilize soil moisture information from AMSR in an optimum manner.